

REMARKS/ARGUMENTS

Favorable reconsideration of this application, is requested in view of the above amendments and in light of the following remarks and discussion.

Claims 20-27 are pending in the present application. Claims 20 and 23 are amended. Support for the amendments to Claims 20 and 23 can be found in the specification at least at page 14, line 23 to page 15, line 9, for example. Thus, no new matter is added.

The outstanding Office Action rejected Claims 20-27 under 35 U.S.C. § 103(a) as unpatentable over Kudo et al. (U.S. Patent No. 6,413,479, hereinafter “Kudo”) in view of Miura et al. (WO 02/098790, hereinafter “Miura”) and Pham et al. (U.S. Patent No. 7,297,169, hereinafter “Pham”).

Applicants respectfully traverse the rejection of Claims 20-27 under 35 U.S.C. § 103(a) as unpatentable over Kudo in view of Miura and Pham.

Amended independent Claim 20 recites a method for starting and normally operating a fuel reforming apparatus that includes supplying the primary fuel to the reformer during normal operation after the completion of start-up so that the combustion gas from the burned fuel is heat exchanged with the primary fuel in the reformer, a water vaporizer and a primary fuel gasifier, and is controlled into temperature level of reaction in the shift converter and the CO remover. Applicants have recognized that one benefit of the above-noted feature is that unnecessary heat exchange may be prevented even in an instance where reactors such as the low-temperature shift converter and the selective oxidation CO remover are nakedly arranged in the cylindrical space which is the flow path of the combustion gas.¹

Moreover, the low-temperature shift converter and the CO remover are water-cooled and are controlled in the appropriate temperature. The cooling water can be used for reforming. The operation of the apparatus is easy since no serious setting of the warming up

¹ See specification at page 14, line 23 to page 15, line 9.

condition is required for maintaining the reformer in an appropriate temperature for starting steam reforming (about 600 °C), while maintaining the low-temperature shift converter in the appropriate temperature.

In contrast, Kudo describes a reforming apparatus with first and second lids (37, 38) disposed at the upper portion of the reforming apparatus that are simultaneously opened and closed to adjust the amount of exhaust gas to be heat exchanged with the shift converter and the CO remover to thereby control the shift converter and CO remover into the appropriate temperature.² The burned exhaust gas is heat exchanged with the steam. However, it is uncertain whether the burned exhausted gas is heat exchanged with the reforming gas to vaporize the reforming material. In other words, the temperature of the burned exhaust gas is not lowered into the level suitable for control of the reaction temperature of the shift converter and the CO remover into the appropriate temperature. Thus, Kudo requires that the first and second lids (37, 38) are to be simultaneously opened and closed to thereby adjust the amount of burned exhausted gas to the heat exchange with the shift converter and the CO remover. In contrast, as discussed above, the temperature, not the amount, of the burned gas is actively controlled by the heat exchange of the primary fuel in the reformer, the water vaporizer and a primary fuel gasifier in the present invention.

Miura fails to remedy the deficiencies discussed above regarding Kudo in relation to amended independent Claim 1. Instead, Miura is silent regarding supplying the primary fuel to the reformer during normal operation after the completion of start-up so that the combustion gas from the burned fuel is heat exchanged with the primary fuel in the reformer, a water vaporizer and a primary fuel gasifier, and is controlled into temperature level of reaction in the shift converter and the CO remover.

² See Kudo at column 21, lines 5-53.

Pham fails to remedy the deficiencies discussed above regarding Kudo and Miura in relation to amended independent Claim 20. Instead, Pham is silent regarding supplying the primary fuel to the reformer during normal operation after the completion of start-up so that the combustion gas from the burned fuel is heat exchanged with the primary fuel in the reformer, a water vaporizer and a primary fuel gasifier, and is controlled into temperature level of reaction in the shift converter and the CO remover.

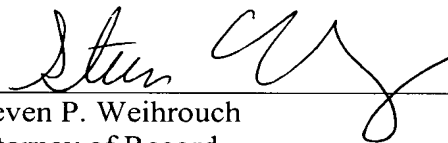
Accordingly, no reasonable combination of Kudo, Miura, and Pham would include all of the features recited in amended independent Claim 20, or claims dependent therefrom. Although differing in scope, amended independent Claim 23, and claims dependent therefrom, include a recitation of substantially similar features with respect to amended independent Claim 20, and patentably distinguish over the cited references for at least the same reasons that amended independent Claim 20 does. Therefore, Applicants respectfully request the rejection of Claims 20-27 under 35 U.S.C. § 103(a) be withdrawn.

For the foregoing reasons, it is respectfully submitted that this application is now in condition for allowance. A Notice of Allowance for Claims 20-27 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below-listed telephone number.

Respectfully submitted,

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